AMENDMENTS TO THE DRAWINGS

Please amend Fig. 5(b), Fig. 5(c), Fig. 6(e) and Fig. 6(f) in accordance with the attached replacement sheets of drawings.

REMARKS

Reconsideration of this application is respectfully requested. Claim 1-11 are pending in this application. Claims 1-11 stand rejected.

Changes to the Drawings

Fig. 5(b) and Fig. 5(c) have been amended in accordance with the attached replacement sheets of drawings to more precisely label the "p" polarization component in these figures. Further, Fig. 6(e) has been amended to change reference numeral "22a" to --22b--. Finally, Fig. 6(f) has been amended to change reference numeral "22a" to --22b--; to change reference numeral "23k" to –23j--; and to change reference numeral "23j" to --23k--. These changes are consistent with the description of these figures in the application specification. Approval and entry of the changes to the drawings are respectfully requested.

Claim Rejections – 35 U.S.C. §103

Claims 1-8 were rejected under 35 U.S.C. §103(a) as being unpatentable over **Patel** (USP 5,414,540) in view of **Sorin et al.** (6,208,774). Claims 9-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over **Patel** in view of **Sorin et al.** and further in view of **Hirabayashi** (USP 5,321,539). For the reasons set forth in detail below, these rejections are respectfully traversed.

Initially, it is noted that the claims have been amended to clarify that the polarizing beam splitter splits the received spectral components "into two linearly polarized optical components

that propagate in different paths, the different paths being at a right angle to each other". Support for this clarifying amendment is provided, e.g., in Fig. 4(b) and 4(c) of the present application, which illustrates the beam splitter 11 splitting incoming optical components into different paths at right angles to each other.

Patel discloses an optical switch for an optical network that can switch separate wavelength division multiplexed (WDM) channels (carrier frequencies) to a selected output channel. More particularly, as shown in Fig. 1, the optical switch includes a diffraction grating 12 that spatially divides an input channel 10 (i.e., broadband input beam) into its frequency components 14, 16. A lens 18 focuses the frequency components 14, 16 upon separate segments 20, 22 of a liquid crystal polarization modulator 24.

The liquid crystal polarization modulator 24 includes an entrance polarization dispersive element 26 disposed on the entrance side to spatially separate the different polarization components of the input beam. The segments 20, 22 of the segmented liquid crystal modulator 24 are separately controllable to either change (rotate) or leave intact the polarization direction of the divided frequency channels 14, 16. An exit polarization dispersive element 28 further separates the frequency components 14, 16 into their respective polarization components. A lens 30 recollimates the beams exiting the exit polarization dispersive element 28 and a second diffraction grating 40 recombines the frequency components having the same polarization into multiple output beams.

The Examiner considers the diffraction grating 12 to correspond to the claimed "spectroscope that separates incoming light into spectral components"; the liquid crystal

polarization modulator 24 to correspond to the claimed "liquid crystal optical switch"; and the lens 18 to correspond to the claimed "lens system".

First, it is noted that as a general matter, the **Patel** reference is directed to a polarization sensitive or polarization dependent liquid crystal optical switch (see, e.g., col. 3, line 20), whereas the liquid crystal optical switch of the present invention is directed to a polarization insensitive or polarization independent liquid crystal optical switch.

Second, it is submitted that none of **Patel**, **Sorin et al.** or **Hirabayashi** disclose or suggest a polarizing beam splitter that splits the received spectral components into two linearly polarized optical components that propagate in different paths, the different paths being at a right angle to each other, as presently recited in claim 1.

Third, although the Examiner interprets the **Patel** reference as disclosing the "spectroscope", "liquid crystal optical switch" and "lens system" as broadly recited in lines 2-6 of claim 1, it is respectfully submitted that **Patel** does not disclose or suggest the details of the structure and function of the liquid crystal optical switch recited in lines 7-12 of claim 1.

More specifically, **Patel** does not disclose or suggest the claim features "*wherein said liquid crystal optical switch comprises a polarizing beam splitter that splits the received spectral components into two linearly polarized optical components that are at a right angle; and at least one reflective type liquid crystal cell that controls the linearly polarized optical components split by said polarizing beam splitter and thereby changes light intensities of the received spectral components for each wavelength and sends them out for selectively changing the light intensities of specific wavelengths.*"

The Examiner apparently recognizes that **Patel** does not disclose or suggest the details of the claimed "liquid crystal optical switch". However, the Examiner's position is apparently that the details of the claimed "liquid crystal optical switch" are "common and known in the art". The Examiner apparently relies on the **Sorin** reference to teach that the details of the claimed "liquid crystal optical switch" are well known. See Office Action, page 2, last full paragraph.

However, **Sorin** does not alleviate the deficiencies of **Patel**. More particularly, **Sorin** discloses a light guiding element for routing a light signal between an input port and an output port or for blocking the propagation of the light signal.

Fig. 3 of **Sorin** illustrates a light switch 300 for transmitting light between an input fiber 300 and an output fiber 302 in one state and blocking transmission between fibers 300, 302 in another state. The input light signal is first separated by crystal 310 into two polarized light beams 308, 309 having orthogonal polarizations. The light beam 309 is then rotated 90 degrees by a beam rotator 312 such that both light beams have the same polarization.

The two light beams 308, 309 enter waveguides constructed of a liquid crystal layer 314. The liquid crystal layer 314 includes top electrodes 315, 316 on one side and bottom electrodes 323, 324 (not shown in Fig. 3) on an opposite side. When an AC field is applied across the corresponding top and bottom electrodes, the light beams are guided in the liquid crystal layer. When no such AC field is applied across the corresponding top and bottom electrodes, the light beams are dispersed and the signals lost. Upon exiting the waveguide, the light signal 308 is rotated through 90 degrees by a polarization rotator 317, the two light beams 308, 309 are recombined by a crystal 318, and input to the output fiber 302.

It is submitted that **Sorin** does not disclose or suggest a liquid crystal optical switch including "*...at least one reflective type liquid crystal cell that controls the linearly polarized optical components split by said polarizing beam splitter and thereby changes light intensities of the received spectral components for each wavelength and sends them out for selectively changing the light intensities of specific wavelengths.*" Unlike the claimed invention, the optical switch disclosed by **Sorin et al.** does not include any ***reflective type liquid crystal cell*** to change the light intensities of received spectral components for each wavelength.

The Examiner is reminded that, as set forth in the Manual of Patent Examining Procedure (MPEP), Eighth Edition, Revision 2, May 2004, §2143.03 "To establish *prima facie* obviousness of a claimed invention, ***all the claim limitations*** must be taught or suggested by the prior art." *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

In view of the above remarks, it is respectfully submitted that **Sorin et al.** does not alleviate the deficiencies of **Patel**, and the combination of the **Patel** and **Sorin et al.** references does not teach or suggest all claim limitations recited in independent claim 1. Moreover, **Hirabayashi**, which was applied to teach the features recited in claims 9-11, does not alleviate any of the above noted deficiencies of **Patel** and **Sorin et al.** Accordingly, it is submitted that independent claim 1, and claims 2-11 which depend therefrom, patentably distinguish over the combination of **Patel** and **Sorin et al.** and the combination of **Patel**, **Sorin et al.** and **Hirabayashi** for at least the above reasons.

Further, it is submitted that the Office Action has not established a *prima facie* case of obviousness because the requisite motivation for combining the references has not been

provided. More specifically, the Office Action asserts "it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ polarizing beam splitting element(s), as common and known in the art, for achieving advantages such as ***high light efficiency resulting in a brighter display***."

However, neither the **Patel** nor the **Sorin et al.** references are related to displays and achieving high light efficiency for a brighter display. Each of the **Patel** and **Sorin** references are related to optical switches that are unrelated to a display. Accordingly, it is submitted that the motivation to combine the references, as provided in the Office Action, is not relevant to the cited references.

Therefore, it is submitted that claim 1 and claims 2-8, which depend from claim 1, patentably distinguish over the combination of **Patel** and **Sorin et al.** for this additional reason.

The Dependent Claims

Moreover, it is submitted that the dependent claims recite additional features not disclosed or suggested by any of the cited prior art references. For example, dependent claim 3 recites "said liquid crystal optical switch elements are arranged in two dimensions in the line direction at a right angle to the line direction", and claims 6 and 7 recite the construction of the optical switch. It is submitted that the features recited in claims 3, 6 and 7 are not disclosed or suggested by any of the cited references, whether taken alone or in combination.

CONCLUSION

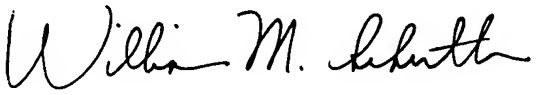
In view of the foregoing amendments and accompanying remarks, it is submitted that all pending claims are in condition for allowance. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are earnestly solicited.

If the Examiner believes that there are issues remaining to be resolved in this application, the Examiner is invited to contact the undersigned attorney at the telephone number indicated below to arrange for an interview to expedite and complete prosecution of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



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